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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 09/834,954      | 04/16/2001  | Tomohide Terashima   | 57454-062           | 5366             |

7590 11/28/2003  
McDERMOTT, WILL & EMERY  
600 13th Street, N.W.  
Washington, DC 20005-3096

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| EXAMINER |
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MONDT, JOHANNES P

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| ART UNIT | PAPER NUMBER |
|----------|--------------|

2826

DATE MAILED: 11/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

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|------------------------------|--------------------------------------|--|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>09/834,954 | <b>Applicant(s)</b><br>TERASHIMA, TOMOHIDE |  |
|                              | <b>Examiner</b><br>Johannes P Mondt  | <b>Art Unit</b><br>2826                    |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <sup>2</sup>/<sub>3</sub> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 29 August 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-4 and 6-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- 7) ☒ Claim(s) 1-4 and 6-13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All   b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                             | 5) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)         | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Response to Amendment***

Amendment filed 8/29/2003 forms the basis of this Office Action. In said Amendment Applicant substantially amended claims 1, 10 and 11. Claims 1-4 and 6-13 are in the application.

### ***Response to Arguments***

1. Applicant's arguments, see Amendment filed 8/29/03, with respect to the claims rejections of claims 1-4 and 6-13 have been fully considered and are persuasive following the Amendment to the claim language filed 8/29/03. The rejections of claims 1-4 and 6-13 have been withdrawn.

### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a) because they fail to show the "first gap part" (claim 1) as described in the specification on page 25, lines 15-20. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The following drawing change would remove the objection: in Figure 25 at least one of those recesses 69 positioned *directly* beneath one of the second impurity regions 35 should be replaced by a gap. The objection to the drawings will not be held in abeyance.

***Specification***

The Specification is objected to for not using the same numeral as shown in Figure 25 for the "P diffusion region". On page 22, second line from below, the wording "P diffusion region 35a" should be replaced by "P diffusion region 35".

***Claim Objections***

2. ***Claim 1*** is objected to because of the following informalities: the wording "vertically positioned relative to the substrate between said first buried impurity region and said semiconductor layer" should be replaced by: "positioned between said first buried impurity region and said semiconductor layer along a line normal to said main surface". Appropriate correction is required.

***Allowable Subject Matter***

3. Subject to removal for the grounds of objection to claim 1, the specification and the drawings, claims 1-4 and 6-9 would become allowable. The following is a statement of reasons for the indication of allowable subject matter:

***With regard to claim 1 (and dependent claims 1-4 and 6-9):*** with reference to the rejection of claim 1 included in the previous Office Action, although Mosher et al (5,256,582) teach all limitations of claim 1 prior to the most recent amendment the second buried impurity region of second conductivity type

is *not* "positioned between said first buried impurity region and said semiconductor substrate along a line normal to said main surface".

***With regard to claim 10 (and dependent claims 11- 13):*** with reference to the rejection of claim 10 included in the previous Office Action and Remarks by Applicant in said Amendment filed 8/29/2003, Mosher et al teach the semiconductor substrate, the semiconductor layer, the buried impurity region, the first and second impurity regions, the semiconductor element and the depletion layer; however a gap part in the buried impurity region, for which the selection according to the most recent rejection was region 24 in Figure 11 is not included in the teaching by Mosher (the DUF is n-type, due to doping with antimony, see Mosher et al, col. 4, l. 64 – col. 5, l. 3, and hence the DUF region cannot be considered as part said buried impurity region, while the separate portions of the DUF region are not connected to any impurity region, but instead being fully embedded in epitaxial layers); furthermore, an alternative interpretation of Mosher et al, Fig. 11, in which regions 42 are selected as the buried impurity region as claimed implies the failure by Mosher et al to teach the claimed "gap part" to be positioned "directly beneath" any region that would qualify as "second impurity region". Said gap part is disclosed through the Specification, page 25, lines 16-19, in combination with Figure 11 after implementation of the change in the Drawings as included in aforementioned Examiner's Amendment.

**Conclusion**

4. This application is in condition for allowance except for the following formal matters:

Applicant should remove the grounds for the objections to the Drawings, the Specification and claim 1 as delineated above.

Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Johannes P Mondt whose telephone number is 703-306-0531. The examiner can normally be reached on 8:00 - 18:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J Flynn can be reached on 703-308-6601. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

RECEIVED J. FLYNN  
SUPERVISORY INVENT EXAMINER  
TECHNOLOGY CENTER 2800

JPM  
November 24, 2003